

## REMARKS

Applicant respectfully requests reconsideration and allowance of the subject application in view of the foregoing amendments and the following remarks.

Claims 21-41 are pending in this application with claims 21, 26, 31, 35, and 38 being independent. Applicant amends claims 21-41 to further clarify features of the claimed subject matter. The original specification and drawings support these claim amendments at least at page 6, lines 22-31, and Figure 1. Therefore, claims 21-41 are presented and directed to subject matter of the original disclosure.

### CLAIM REJECTIONS UNDER 35 U.S.C. § 102

**Claims 21-24 and 35-37** stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,513,314 to Kandasamy et al. (hereinafter “Kandasamy”). Applicant respectfully traverses the rejection.

Without conceding the propriety of the stated rejection, and only to advance the prosecution of this application, Applicant amends **independent claim 21** to further clarify features of the claimed subject matter. Amended claim 21 now recites a method of managing a write request from a first compute node in a *storage area network* to a first storage node in the storage area network, comprising (emphasis added):

if there is an available *direct communication link between the first compute node, a first switch*, and the first storage node, then executing the write request from the first compute node to the first storage node using the available direct communication link;

if there is not an available direct communication link between the first compute node and the first storage node, then:

transmitting the write request from the first compute node to a second compute node if there is an available direct communication path from the first compute node to the second compute node and an available direct communication link from the

second compute node *through the first switch or a second switch* to the first storage node.

Applicant submits that the Office has failed to show that Kandasamy discloses such a method.

**The Office Fails to Show that Kandasamy Discloses Such a Storage Area Network.**

It appears that the Office has failed to show that Kandasamy discloses such a method for a storage area network. The Office cites to the previous rejection in the Office Action dated October 22, 2007. In this rejection, the Office cites to Kandasamy, Col. 6, line 20 as well as Col. 12, line 65. Applicant respectfully disagrees. Rather, Kandasamy describes a fault tolerant computer system for network filesystem data transactions. *See*, Col. 3, lines 4-5. The fault tolerant protocol of Kandasamy provides for the configuration of the primary and secondary servers so that multiple active groups can be formed. *See*, Col. 6, lines 36-38. Each active group in Kandasamy thus appears to a unique virtual server the serves a set of one or more filesystems. *See*, Col. 6, lines 38-40. Further, a network filesystem, or network-attached storage (NAS), uses a storage unit with a built-in server that can communicate with clients over a network. *See*, Microsoft Computer Dictionary, Fifth Edition. In this file based system, it is clear that the storage is remote, and computers request a portion of an abstract file rather than a disk block. *See*, Wikipedia.

In contrast, Applicant's amended claim 1 recites "*a method of managing a write request from a first compute node in a **storage area network** to a first storage node in the storage area network, comprising: if there is an available direct communication link between the first compute node, a first switch, and the first storage node, then executing the write request from the first compute node to the first storage node using the available direct communication link.*" A

storage area network, or SAN, includes components such as hubs and routers that are also used in local area networks, but it differs in being something of a “subnetwork” dedicated to providing a high-speed connection between storage elements and servers. *See, Microsoft Computer Dictionary, Fifth Edition.* Further, a SAN is an architecture to attach remote computer storage devices to servers in such a way that, to the operating system, the devices appear as locally attached. *See, Wikipedia.*

To further assist the Office in appreciating the claimed subject matter, the following excerpt is reproduced from the Applicant’s Specification.

**Applicant’s Specification, page 6, line 22 to page 7, line 9**

A storage area network has a first compute node 100 that has a link 102 to a first switch or hub 104. The first switch or hub 104 also has a link 106 to a first storage node 108, and a link 110 to a second storage node 112. A path therefore exists from the first compute node 100 through the first switch 104 to each of the first storage node 108 and second storage node 112.

Similarly, the network has a second compute node 120 that has a link 122 to the first switch or hub 104 and a link 124 to a second switch or hub 126. The second switch or hub 126 also has a link 128 to the first storage node 108, and a link 130 to the second storage node 112. A path therefore exists from the second compute node 120 through the second switch 126 to each of the first storage node 108 and second storage node 112.

A dataset is mirrored, such that a first copy 131 of the dataset is maintained on the first storage node 108, and a second copy 132 maintained on the second storage node 112. This data set is in use by the first compute node 100, and may also be in use by other nodes of the SAN.

As the Office has failed to show that Kandasamy discloses these recited features, Applicant respectfully submits that claim 21 is not anticipated by Kandasamy. Therefore, Applicant respectfully requests that the § 102 rejection be withdrawn.

**Dependent claims 22-24** depend directly or indirectly from independent claim 21 and thus are allowable as depending from an allowable base claim. Dependent claims 22-24 are also allowable for their own recited features that, in combination with those recited in claim 21 are not shown by the Office to be disclosed by Kandasamy.

Thus, Applicant respectfully submits that as each and every feature is not disclosed, the claims are not anticipated by Kandasamy. Applicant respectfully requests that the § 102 rejections be withdrawn.

### **Independent Claim 35**

Without conceding the propriety of the stated rejection, and only to advance the prosecution of this application, Applicant amends independent claim 35 to further clarify features of the claimed subject matter. Amended claim 35 now recites one or more computer-readable media comprising logic instructions for managing a write request from a first compute node in a storage area network to a first storage node in the storage area network, that, when executed by a processor, cause the processor to perform operations comprising:

executing a write request from the first compute node to the first storage node using an available communication path between the first compute node and the first storage node;

if there is not an available communication path between the first compute node and the first storage node, then:

transmitting the write request from the first compute node to a second compute node if there is an available direct communication path from the first compute node to the second compute node and an available direct communication path from the second compute node through a first switch or a second switch to the first storage node.

Applicant respectfully submits that the Office has failed to show that Kandasamy discloses such a storage area network and is allowable for reasons similar to those discussed above with respect to claim 21. For example, the Office has failed to show that Kandasamy

*discloses “a write request from a first compute node in a storage area network to a first storage node in the storage area network, that, when executed by a processor, cause the processor to perform operations comprising...transmitting the write request from the first compute node to a second compute node if there is an available direct communication path from the first compute node to the second compute node and an available direct communication path from the second compute node through a first switch or a second switch to the first storage node,” as recited in Applicant’s amended claim 35.*

As the Office has failed to show that Kandasamy discloses these recited features, Applicant respectfully submits that claim 35 is not anticipated by Kandasamy. Therefore, Applicant respectfully requests that the § 102 rejection be withdrawn.

**Dependent claims 36 and 37** depend directly or indirectly from independent claim 35 and thus are allowable as depending from an allowable base claim. Dependent claims 36 and 37 are also allowable for their own recited features that, in combination with those recited in claim 35 are not shown by the Office to be disclosed by Kandasamy.

Thus, Applicant respectfully submits that the Office has failed to show that each and every feature is disclosed, and thus the claims are not anticipated by Kandasamy. Applicant respectfully requests that the § 102 rejections be withdrawn.

**CLAIM REJECTIONS UNDER 35 U.S.C. § 103: A., B. C., AND D.**

**A. Claim 25** stands rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,513,314 to Kandasamy et al (hereinafter “Kandasamy”) and in further view of Official Notice. Applicant respectfully traverses the rejection.

Applicant submits that all of the criteria set forth for making a prima facie case have not been met by the Office. This set of § 103(a) rejections rely on Kandasamy as the primary reference. As explained above with respect to independent claim 21, Applicant submits that

Kandasamy fails to disclose the features of independent claim 21. Dependent claim 25 depends indirectly from independent claim 21 and is allowable by virtue of this dependency. This dependent claim is also allowable for its own recited features that in combination with those recited in independent claim 21 are not disclosed, taught, or suggested by Kandasamy.

Applicant agrees with the Office that Kandasamy does not specifically disclose transmitting an error message from the second source node to the first source node if the write request fails. *See*, Office Action dated October 22, 2007, page 6. Applicant respectfully submits that the Office's Official Notice fails to remedy the deficiencies of Kandasamy. Furthermore, the Office's Official Notice does not provide any citations that Applicant may provide further discussion for the claim rejections.

Thus, Kandasamy and/or the Office's Official Notice, alone or in combination do not disclose, teach, or suggest those features recited in Applicant's dependent claim 25. Accordingly, Applicant submits that the evidence relied upon by the Office no longer supports the rejections made under § 103 and thus Applicant respectfully requests that the § 103 rejection be withdrawn.

**B. Claims 26-30** stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,513,315 to Kandasamy et al (hereinafter "Kandasamy") in view of U.S. Patent No. 6,751,190 to Swallow. Applicant respectfully traverses the rejection.

Without conceding the propriety of the stated rejection, and only to advance the prosecution of this application, Applicant amends independent claim 26 to further clarify features of the claimed subject matter. Amended claim 26 now recites a method of managing a write request from a first compute node in a storage area network to a mirrored storage data set

having a first storage node and a second storage node in the storage area network, comprising:

- if there are available communication paths between the first compute node and both the first storage node and the second storage node in the mirrored data set, then executing the write request from the first compute node to both the first storage node and the second storage node using the available communication paths;

- if there are no available communication paths between the first compute node and the first storage node and the second storage node, then invoking an error routine;

- if there is an available communication path between the first compute node and only one of the first storage node and the second storage node in the mirrored data set, then:

  - executing the write request from the first compute node to the first storage node or the second storage node via the available communication path;

  - transmitting the write request from the first compute node to a second compute node if there is an available direct communication path from the first compute node to the second compute node and an available communication path from the second node through a first switch or a second switch to the first storage node or the second storage node.

Applicant submits that all of the criteria set forth for making a prima facie case have not been met by the Office. This set of § 103(a) rejections rely on Kandasamy as the primary reference and Swallow as the secondary reference. As explained above with respect to independent claim 21, Applicant submits that Kandasamy fails to disclose the features of independent claim 26. Therefore, Applicant respectfully submits that the Office has failed to show that Kandasamy discloses such a method for a storage area network and is allowable for reasons similar to those discussed above with respect to claim 21. For example, the Office has failed to show that Kandasamy discloses “managing a write request from a first compute node in a storage area network to a mirrored storage data set having a first storage node and a second storage node in the storage area network, comprising... transmitting the write request from the first compute node to a second compute node if there is an available direct communication path

from the first compute node to the second compute node and an available communication path from the second node through a first switch or a second switch to the first storage node or the second storage node,” as recited in Applicant’s amended claim 26.

Further, Applicant respectfully submits that Swallow fails to remedy the deficiencies of Kandasamy. Rather, Swallow describes assigning a label to each communication link. *See*, Col. 2, line 18. A plurality of labels for each communication link in Swallow is stored in a node prior to any communication failure. *See*, Col. 2, lines 18-20. The node in Swallow may determine the label assigned to a communication link from the stored labels. *See*, Col. 2, lines 20-22.

Thus, Kandasamy and/or Swallow, alone or in combination, do not disclose, teach, or suggest the claimed subject matter. Accordingly, Applicant submits that the evidence relied upon by the Office no longer supports the rejections under § 103 and respectfully requests that the § 103 rejection of these claims should be withdrawn.

**Dependent claims 27-30** depend directly or indirectly from independent claim 26 and thus are allowable by virtue of this dependency, as well as for additional features that they recite. Applicant also respectfully requests individual consideration of each dependent claim.

Applicant respectfully submits that the cited references do not render the claimed subject matter obvious and that the claimed subject matter therefore, patentably distinguishes over the cited references. For all of these reasons, Applicant respectfully requests the § 103 rejection of these claims should be withdrawn.

**C. Claims 31-33 and 38-40** stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 6,751,190 to Swallow in view of U.S. Patent No. 5,513,315 to Kandasamy et al (hereinafter “Kandasamy”). Applicant respectfully traverses the rejection.



Without conceding the propriety of the stated rejection, and only to advance the prosecution of this application, Applicant amends independent claim 31 to further clarify features of the claimed subject matter. Amended claim 31 now recites a method of performing a surrogate write operation in a storage area network, comprising:

receiving, at a second compute node, a query from a first compute node, wherein the query identifies a target node in the storage network for the surrogate write operation;

transmitting a reply to the first compute node, wherein the reply includes a signal component indicating there is an available communication path between the second compute node and the target node; and

relaying write operations from the first compute node to the target node.

Applicant respectfully submits that no such method is disclosed, taught, or suggested by Swallow and/or Kandasamy, alone or in combination.

**Swallow Fails to Disclose the Claimed Method of Performing a Surrogate Write Operation in a Storage Area Network**

Applicant respectfully submits that Swallow fails to disclose the claimed method of performing a surrogate write operation in a storage area network. The Office cites to Column 4, line 19 as well as Figures 2-4 of Swallow as meeting the limitation of portions of Applicant's amended claim 31. Applicant respectfully disagrees. Rather, Swallow describes assigning a label to each communication link. *See*, Col. 2, line 18. A plurality of labels for each communication link in Swallow is stored in a node prior to any communication failure. *See*, Col. 2, lines 18-20. The node in Swallow may determine the label assigned to a communication link from the stored labels. *See*, Col. 2, lines 20-22. Swallow further describes the Message Identification Object 402 identifies the message type as a Path Message 400. *See*, Col. 4, lines 19-20.

*In contrast, Applicant's amended claim 31 recites "receiving, at a second compute node, a query from a first compute node, wherein the query identifies a target node in the storage network for the surrogate write operation; transmitting a reply to the first compute node, wherein the reply includes a signal component indicating there is an available communication path between the second compute node and the target node; and relaying write operations from the first compute node to the target node."*

To assist the Office in appreciating the claimed subject matter, Applicant provides the following illustrative excerpt from Applicant's Specification.

**Applicant's Specification, page 8, line 22 to page 9, line 18**

In a network embodying the present invention, when first compute node 100 can not reach first storage node 108, second compute node 120 can reach first storage node 108, and first compute node 100 can reach second compute node 120; the second compute node 120 performs surrogate write operations in behalf of first compute node 100. This permits maintenance of synchronization between the first copy 131 and the second copy 132 of the data set.

Surrogate read or write operations may also be performed to non-mirrored datasets, provided that a path exists from the compute node desiring the read or write to a compute node having a path to the destination device.

Each compute node maintains a list of paths to storage nodes. This list includes status of the paths. It is known that path status can change to failed should a problem occur with a link, switch, or other network device.

When surrogate writes are enabled and a compute node desires to write a dataset 200 (Figure 2), that node checks 202 the path status to the storage node on which the dataset is stored. If that path has a status of "path ok" 204, a write is attempted 206 to the dataset on that node. If the write succeeds, all is well. If the write fails 208 for reasons that are likely to be a result of a failed path to the storage node, such as a fibre channel timeout error, the node looks for a path 210 to a second compute node, and verifies that that path has a status of "path ok".

Applicant agrees with the Office that Swallow does not disclose that such a (bypass) tunnel may be used for the surrogate write operation and relaying write operations from the first source node to the target node. *See*, Office Action dated October 22, 2007, page 13. However, Applicant respectfully submits that Kandasamy fails to compensate for the deficiencies of Swallow. Rather, Kandasamy describes a fault tolerant computer system for network filesystem data transactions. *See*, Col. 3, lines 4-5. The fault tolerant protocol of Kandasamy provides for the configuration of the primary and secondary servers so that multiple active groups can be formed. *See*, Col. 6, lines 36-38. Each active group in Kandasamy thus appears to a unique virtual server the serves a set of one or more filesystems. *See*, Col. 6, lines 38-40.

Thus, Swallow and/or Kandasamy, alone or in combination, do not disclose, teach, or suggest the claimed subject matter. Accordingly, Applicant submits that the evidence relied upon by the Office no longer supports the rejections under § 103 and respectfully requests that the § 103 rejection of these claims should be withdrawn.

**Dependent claims 32 and 33** depend directly from independent claim 31 and thus are allowable by virtue of this dependency, as well as for additional features that they recite. Applicant also respectfully requests individual consideration of each dependent claim.

Applicant respectfully submits that the cited references do not render the claimed subject matter obvious and that the claimed subject matter therefore, patentably distinguishes over the cited references. For all of these reasons, Applicant respectfully requests the § 103 rejection of these claims should be withdrawn.

**Independent Claim 38**

Without conceding the propriety of the stated rejection, and only to advance the prosecution of this application, Applicant amends independent claim 38 to further clarify features of the claimed subject matter. Amended claim 38 now recites one or more computer-readable media comprising logic instructions for performing a surrogate write operation in a storage area network that, when executed by a processor, cause the processor to perform operations comprising:

- receiving, at a second compute node, a query from a first compute node, wherein the query identifies a target node in the storage area network for the surrogate write operation;
- transmitting a reply to the first compute node, wherein the reply includes a signal component indicating there is an available communication path between the second compute node and the target node; and
- relaying write operations from the first compute node to the target node.

Applicant respectfully submits that the Office has failed to show that Swallow discloses such a surrogate write operation and is allowable for reasons similar to those discussed above with respect to claim 31. For example, the Office has failed to show that Swallow discloses “*one or more computer-readable media comprising logic instructions for performing a surrogate write operation in a storage area network that, when executed by a processor, cause the processor to perform operations comprising...receiving, at a second compute node, a query from a first compute node, wherein the query identifies a target node in the storage area network for the surrogate write operation; transmitting a reply to the first compute node, wherein the reply includes a signal component indicating there is an available communication path between the second compute node and the target node,*” as recited in Applicant’s amended claim 38.

Applicant agrees with the Office that Swallow does not disclose that such a (bypass) tunnel may be used for the surrogate write operation and relaying write operations from the first

source node to the target node. *See*, Office Action dated October 22, 2007, page 13. However, Applicant respectfully submits that Kandasamy fails to compensate for the deficiencies of Swallow. Rather, Kandasamy describes a fault tolerant computer system for network filesystem data transactions. *See*, Col. 3, lines 4-5. The fault tolerant protocol of Kandasamy provides for the configuration of the primary and secondary servers so that multiple active groups can be formed. *See*, Col. 6, lines 36-38. Each active group in Kandasamy thus appears to a unique virtual server the serves a set of one or more filesystems. *See*, Col. 6, lines 38-40.

Thus, Swallow and/or Kandasamy, alone or in combination, do not disclose, teach, or suggest the claimed subject matter. Accordingly, Applicant submits that the evidence relied upon by the Office no longer supports the rejections under § 103 and respectfully requests that the § 103 rejection of these claims should be withdrawn.

**Dependent claims 39 and 40** depend directly from independent claim 38 and thus are allowable by virtue of this dependency, as well as for additional features that they recite. Applicant also respectfully requests individual consideration of each dependent claim.

Applicant respectfully submits that the cited references do not render the claimed subject matter obvious and that the claimed subject matter therefore, patentably distinguishes over the cited references. For all of these reasons, Applicant respectfully requests the § 103 rejection of these claims should be withdrawn.

**D. Claims 34 and 41** stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 6,751,190 to Swallow in view of U.S. Patent No. 5,513,315 to Kandasamy et al (hereinafter “Kandasamy”) and in further view of Official Notice. Applicant respectfully traverses the rejection.

Applicant submits that all of the criteria set forth for making a prima facie case have not been met by the Office. This set of § 103(a) rejections rely on Swallow as the primary reference

and Kandasamy as the secondary reference. As explained above with respect to independent claims 31 and 38, Applicant submits that Swallow fails to disclose the features of independent claim 31 and 38. Dependent claims 34 and 41 depend directly from one of independent claims 31 and 38, respectively, and are allowable by virtue of this dependency. These dependent claims are also allowable for their own recited features that in combination with those recited in independent claim 31 and 38 are not disclosed, taught, or suggested by Swallow.

Applicant agrees with the Office that Swallow in view of Kandasamy does not disclose transmitting failure signal from the second source node to the first source node if the write request fails. *See*, Office Action, dated October 22, 2007, page 17. Applicant respectfully submits that the Office's Official Notice fails to remedy the deficiencies of Swallow and/or Kandasamy. Furthermore, the Office's Official Notice does not provide any citations that Applicant may provide further discussion for the claim rejections.

Thus, Swallow, Kandasamy and/or the Office's Official Notice, alone or in combination do not disclose, teach, or suggest those features recited in Applicant's dependent claims 34 and 41. Accordingly, Applicant submits that the evidence relied upon by the Office no longer supports the rejections made under § 103 and thus Applicant respectfully requests that the § 103 rejection be withdrawn.

**CONCLUSION**

Claims 21-41 are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of the subject application. If any issue remains unresolved that would prevent allowance of this case, the Office is requested to contact the undersigned attorney to resolve the issue.

Respectfully submitted,

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